DRAFT

ENGINEERING EVALUATION
Western Park Apartments
P#16872-A#12008
1280 Laguna Street
San Francisco, CA 94116

BACKGROUND

Western Park Apartments has applied for an Authority to Construct and/or Permit to Operate the following equipment:

S-1 Emergency Standby Generator: Diesel Engine Make: Cummins; Model: 6BTA5.9-G4; Rated Horsepower: 170 HP.

EMISSIONS SUMMARY

Annual Emissions:

The 170 HP diesel engine at S-1 is CARB Certified and the emission factors are listed below in Table (1). For this report, it is assumed that the emission value of Total Unburned Hydrocarbons (HC) is equivalent to the emission value of POC.

Table (1)

Emission Factors		
Component	Emission (g/kw·hr)	Emission (g/bhp·hr)
NOx	6.08	4.54
CO	0.80	0.60
POC	0.32	0.24
PM_{10}	0.17	0.13
SO_2*	0.25	0.184

**The emission factor for SO2 is from Chapter 3, Table 3.4-1 of the EPA Document AP-42, Compilation of Air Pollutant Emission Factors.*
SO_2 8.09E-3 (% S in fuel oil) lb/hp-hr = 8.09E-3 (0.05% S) (454 g/lb) = 0.184 g/hp-hr

Maximum Emissions in Tons per year:

Table (2)

Maximum Emissions in Tons per year	
NOx	= (4.54 g/bhp-hr)(170 hp)(50 hrs/yr)(1lb/453.6g) = 84.96 lb/yr = 0.042 TPY
CO	= (0.60 g/bhp-hr)(170 hp)(50 hrs/yr)(1lb/453.6g) = 11.18 lb/yr = 0.006 TPY
POC	= (0.24 g/bhp-hr)(170 hp)(50 hrs/yr)(1lb/453.6g) = 4.47 lb/yr = 0.002 TPY
PM_{10}	= (0.13 g/bhp-hr)(170 hp)(50 hrs/yr)(1lb/453.6g) = 2.38 lb/yr = 0.001 TPY
SO_2	= (0.18 g/bhp-hr)(170 hp)(50 hrs/yr)(1lb/453.6g) = 3.49 lb/yr = 0.002 TPY

Maximum Daily Emissions:

A full 24-hour day will be assumed since no daily limits are imposed on intermittent and unexpected operations. Check Table (3) for emissions per day.

Table (3)

Maximum Daily Emissions		
NOx	= (4.54 g/bhp-hr)(170 hp)(24 hrs/day)(1lb/453.6g) =	40.78 lb/day
CO	= (0.60 g/bhp-hr)(170 hp)(24 hrs/day)(1lb/453.6g) =	5.37 lb/day
POC	= (0.24 g/bhp-hr)(170 hp)(24 hrs/day)(1lb/453.6g) =	2.15 lb/day
PM_{10}	= (0.13 g/bhp-hr)(170 hp)(24 hrs/day)(1lb/453.6g) =	1.14 lb/day
SO_2	= (0.18 g/bhp-hr)(170 hp)(24 hrs/day)(1lb/453.6g) =	1.70 lb/day

Plant Cumulative Increase: (tons/year): Cumulative increase from the plant is as shown in Table (4).

Table (4)

Plant Cumulative Increase			
Pollutant	Existing tons/yr.	New tons/yr.	Total tons/yr.
NOx	0	0.042	0.042
CO	0	0.006	0.006
POC	0	0.002	0.002
PM10	0	0.001	0.001
SO_2	0	0.002	0.002
NPOC	0	0.000	0.000

Toxic Risk Screening:
The toxic emission of diesel particulate exceeds the District Risk Screening Trigger level, as shown below in Table (5). A Risk Screening Analysis has been performed.

Table (5)

Toxic Emission Of Diesel Particulate						
Source	PM_{10} Emission Factor (g/HP-hr)	HP	Annual Usage (Hours/year)	Diesel Exhaust Particulate Emissions (lb/year)	Trigger Level (lb/yr)	Risk Screen Required? (Yes/No)
1	0.13	170	50	2.4	0.64	Yes

Calculation:

PM_{10} from CARB Certified levels 0.17 (g/kW-hr) / 1.341 (hp/kW) = 0.13 (g/hp-hr)
Diesel Exhaust Particular Emission (lb/yr.) = PM_{10} (g/hp-hr) * HP * Annual Usage (hr/yr)
= 0.13 * 170 * 50
= 1105 g/yr / 453.6 g/lb
= 2.4 lb/yr

Since the engine meets Best Available Control Technology for Toxics (TBACT) requirements (emission level of 0.15 g/hp-hr or less), the maximum acceptable cancer risk is estimated at 10 in a million. Results from the health risk screening analysis show that for 50 hours of operation per year, excluding periods when operation is required due to emergency conditions, the risk to the maximally exposed nearest receptor is 3.8 in a million. The analysis was performed at a PM_{10} emission of 2.4 lb/year (see the April 25, 2005 memo from the Toxics Evaluation Section). In accordance with the District's Risk Management Policy, this risk level is considered acceptable.

Public Notification:

Since this plant is located within 1000 ft of the following schools public notification is required.

1. Golden Gate Kindergarten Association
2. Sacred Heart Cathedral Prep.
3. Rosa Parks Elementary.

STATEMENT OF COMPLIANCE

S-1 will be operated as emergency standby engines and therefore are not subject to the emission rate limits in Regulation 9, Rule 8 ("NOx and CO from Stationary Internal Combustion Engines"). S-1 is subject to the monitoring and record keeping requirements of Regulation 9-8-530 and the SO2 limitations of 9-1-301 (ground-level concentration) and 9-1-304 (0.5% by weight in fuel). Regulation 9-8-530 requirements are incorporated into the proposed permit conditions. Compliance with Regulation 9-1 is expected since diesel fuel with a 0.05% by weight sulfur is mandated for use in California. Like all sources, S-1 is subject to Regulation 6 ("Particulate and Visible Emissions"). These engines are not expected to produce visible emissions or fallout in violation of this regulation and they will be assumed to comply with Regulation 6 pending a regular inspection.

This application is considered ministerial under the District's proposed CEQA guidelines (Regulation 2-1-312) and therefore is not subject to CEQA review. The engineering review for this project requires only the application of standard permit conditions and standard emission factors in accordance with Permit Handbook Chapter 2.3.

Best Available Control Technology (BACT):

In accordance with Regulation 2, Rule 2, Section 301, BACT is triggered for any new or modified source with the potential to emit 10 pounds or more per highest day of POC, NPOC, NOx, CO, SO_2 or PM_{10}.

Based on the emission calculations above, the owner/operator of S-1 is subject to BACT for the following pollutants: POC, NOx and CO. BACT 1 levels do not apply for 'engines used exclusively for emergency use during involuntary loss of power' as per Reference b, Document 96.1.2 of the BAAQMD BACT Guidelines for IC Engines. Hence, the owner/operator has to the meet BACT 2 limits presented below in Table (6).

Table (6)

BACT 2 Limits		
POLLUTANT	BACT 1. Technologically Feasible/ Cost Effective 2. Achieved in Practice 3. TBACT	TYPICAL TECHNOLOGY
POC	1. ***0.30 g/bhp-hr*** *[62 ppmvd @ 15% O_2]* [a,b] 2. ***1.5 g/bhp-hr*** *[309 ppmvd @ 15% O_2]* [b]	1. *Catalytic Oxidation and CARB or EPA (or equivalent) low-total hydrocarbon emitting certified engine* [a,b] 2. *CARB or EPA (or equivalent) low-total hydrocarbon emitting certified engine b,c*
NOx	1. ***1.5 g/bhp-hr*** *[107 ppmvd @ 15% O_2]* [a,b] 2. ***6.9 g/bhp-hr*** *[490 ppmvd @ 15% O_2]* [a,b,c] ***3. 69 g/bhp-hr*** *[490 ppmvd @ 15% O_2]*	1. *Selective Catalytic Reduction (SCR) + Timing Retard + Turbocharger w/ Intercooler* [a,b] 2. *Timing Retard $\leq 4^o$ + Turbocharger w/ Intercooler* [a,b,c] 3. *Timing Retard $\leq 4^o$ + Turbocharger w/ Intercooler*
CO	1. *n/s* 2. 2.75 ***g/bhp-hr*** *[319 ppmvd @ 15% O2]* [b,c]	1. *Catalytic Oxidation* [b] 2. *CARB or EPA (or equivalent) low-CO emitting certified engine b,c*

For POC, NOx, and CO, the emission limits set by BACT 2 are met, as shown in Table (7) below.

Table (7)

Analysis of BACT2 Limits			
Pollutant	Engine Emission Factors with Catalyst (g/hp-hr)	Emission Factor Limits as set by BACT 2 (g/hp-hr)	Have the limits been met?
POC	0.24	1.5	YES
NOx	4.54	6.9	YES
CO	0.60	2.75	YES

Therefore, S-1 is determined to comply with the BACT 2 limits for POC, NOx and CO.
Since CARB certification data was used to establish the POC, NOx and CO emission factors, the BACT 2 emission limits have not been incorporated into the permit conditions and are assumed

to be complied with through the design standards demonstrated by the CARB certification testing.

Offsets: Offsets must be provided for any new or modified source at a facility that emits more than 10 tons/yr of POC or NOx. Based on the emission calculations above, offsets are not required for this application.

PSD, NSPS, and NESHAPS do not apply.

Airborne Toxic Control Measure (ATCM): This facility will comply with new ATCM. Compliance with the following permit conditions will meet the ATCM requirements.

PERMIT CONDITIONS

Plant #: 16872; Application #: 12008; Company Name: Western Park Apts, Inc Condition: #21911; For S-1

1. Hours of Operation: The owner/operator shall operate the emergency standby engine(s) only to mitigate emergency conditions or for reliability-related activities. Operating while mitigating emergency conditions is unlimited. Operating for reliability-related activities are limited to 50 hours per any calendar year. [Basis: Regulation 9-8-330]

   "Emergency Conditions" is defined as any of the following:
   a. Loss of regular natural gas supply.
   b. Failure of regular electric power supply.
   c. Flood mitigation.
   d. Sewage overflow mitigation.
   e. Fire.
   f. Failure of a primary motor, but only for such time as needed to repair or replace the primary motor.

   [Basis: Regulation 9-8-231]

   "Reliability-related activities" is defined as any of the following:
   a. Operation of an emergency standby engine to test its ability to perform for an emergency use, or
   b. Operation of an emergency standby engine during maintenance of a primary motor.

   [Basis: Regulation 9-8-232]

2. The owner/operator shall equip the emergency standby engine(s) with either:
   a. a non-resettable totalizing meter that measures the hours of operation for the engine; or

b. a non-resettable fuel usage meter, the maximum hourly fuel rate shall be used to convert fuel usage to hours of operation.

[Basis: Regulation 9-8-530]

3. Records: The owner/operator shall maintain the following monthly records in a District-approved log for at least 2 years and shall make the log available for District inspection upon request:
   a. Hours of operation (total).
   b. Hours of operation (emergency).
   c. For each emergency, the nature of the emergency condition.
   d. Fuel usage for engine(s) if a non-resettable fuel usage meter is utilized.

[Basis: Regulations 9-8-530 and 1-441]

RECOMMENDATION

Issue an Authority to Construct to Western Park Apts. Located at 1280 Laguna Street, San Francisco, CA 94115:

EXEMPTIONS

None.

By: Madhav Patil Date: 05/19/05

Air Quality Engineering

Acronyms:			
S-1	Source one	NPOC	Non- Precursor Organic Compound
HP	Horse Power	TBACT	Best Available Control Technology for Toxics
CARB	California Air Resource Board	BACT	Best Available Control Technology
NOx	Oxides of Nitrogen as NO_2	BAAQMD	Bay Area Air Quality Management District
CO	Carbon Monoxide	IC Engines	Internal Combustion Engines
POC	Precursor Organic Compound	EPA	Environmental Protection Agency
HC	Hydrocarbons	SCR	Selective Catalytic Reduction
PM_{10}	Particulate Matter	PSD	Prevention of Significant Deterioration
SO_2	Sulfur Dioxide	NSPS	New Source Performance Standard
O_2	Oxygen	NESHAPS	National Emission Standard for Hazardous Air Pollutants
ppmv	parts per million by volume	CEQA	California Environmental Quality Act
ATCM	Airborne Toxic Control Measure		